Verbal stem space and verb to noun conversion in French

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Abstract

In this paper I present the verbal stem space in French and its use in lexeme formation. First, I present the stem spaces worked out by Bonami & Boyé (2002; 2003; 2005) for verbs and adjectives. Then I show that the verbal stem space needs to be extended with an extra slot in order to account for a number of lexeme-formation rules. Finally, I show that verb to noun conversion can select three different stems as input.

1 Introduction

In this paper I address the use of the verb stems made by a particular French lexeme-formation process which is the verb to noun conversion. Conversion is usually defined as a lexeme-formation process in which the base lexeme and the derived lexeme are phonologically identical, as in the examples in (1), where both noun to verb and verb to noun conversions are illustrated. Although I have shown in Tribout (2010) that it is a complex issue, I will not consider the directionality of conversion in this paper as it is not crucial to the question addressed here. As we can see in the examples in (1), in English, the bare forms of the verbs GLUE and WALK are identical to the nouns GLUE and WALK. As for French, the verbs COLLER and MARCHER have a basic stem identical to the singular of the nouns COLLE and MARCHE. In this sense, if the inflectional affixes are abstracted away, base and derivative are indistinguishable.

(1) (a) Engl. GLUE > TO GLUE
TO WALK > WALK
(b) Fr. COLLE > COLLER
MARCHER > MARCHE

However, there are cases of conversion where the lexemes are not identical, as shown by the examples in (2). The pair APPELER > APPEL in (2a) shows a ə/ɛ alternation.

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Table 1. Stem alternation within the inflection of a few verbs.

Lexeme		indicative present 1st pers. sg		indicative present 1st pers. pl	
APPELER	'to call'	*appelle*	(apɛl)	*appelons*	(apəl-ɔ̃)
MAINTENIR	'to maintain'	*maintiens*	(mɛ̃tjɛ̃)	*maintenons*	(mɛ̃tən-ɔ̃)
JETER	'to throw'	*jette*	(ʒɛt)	*jetons*	(ʒət-ɔ̃)
SOUTENIR	'to support'	*soutiens*	(sutjɛ̃)	*soutenons*	(sutən-ɔ̃)

EXAMINER > EXAMEN in (2b) shows an alternation between an oral vowel followed by a nasal consonant (VN) and a nasal vowel (Ṽ). The example SAUTER > SAUT in (2c) illustrates a very common rule of sandhi in French, which is described since Damourette & Pichon (1927) using the concept of 'latent consonant'. The pair SOUTENIR > SOUTIEN in (2d) illustrates a further kind of allomorphy.

(2) (a) APPELER 'to call' /apəle/ > APPEL 'call' /apɛl/
(b) EXAMINER 'to examine' /ɛgzamine/ > EXAMEN 'examination' /ɛgzamɛ̃/
(c) SAUTER 'to jump' /sote/ > SAUT 'jump' /so/
(d) SOUTENIR 'to support' /sutəniʁ/ > SOUTIEN 'support' /sutjɛ̃/

These different alternations between the base verb and the converted noun are not isolated phenomena. Within inflection we observe the same kind of alternations between the different stems of a single lexeme. The alternation between SOUTENIR and SOUTIEN and the ə/ɛ alternation between APPELER and APPEL occur in the inflection of these verbs and others, as shown in Table 1. As for VN/Ṽ and C/Ø alternations like those observed in the pairs EXAMINER > EXAMEN and SAUTER > SAUT, they are common in the inflection of adjectives, as shown in Table 2.

Since the alternations observed between the verb and the noun in some instances of conversion are the same as the stem allomorphies observed within the inflection of certain lexemes, we can build on proposals for dealing with stem allomorphy in order to account for the dissimilarity between the base verb and the derived noun in the examples in (2). To account for verbal and adjectival stem allomorphy Bonami & Boyé (2002; 2003; 2005) have proposed that each French verb and adjective possess an indexed list of stems, which is called 'stem space'. I will first present the stem space for verbs, adjectives and nouns in French. Then I will show how these stem spaces can be used in derivation to account for verb to noun conversion.

2 Stem spaces for verbs, adjectives and nouns in French

Boyé (2000) and Bonami & Boyé (2002; 2003) have observed that when a French verb needs several stems in order to be inflected, those stems are not randomly distributed across the paradigm. Instead, they always occur in the same zones of the paradigm,

Table 2. Stem alternation within the inflection of a few adjectives.

Lexeme		masculine form		feminine form	
BON	'good'	*bon*	(bɔ̃)	*bonne*	(bɔn)
FIN	'thin'	*fin*	(fɛ̃)	*fine*	(fin)
GRAND	'tall'	*grand*	(gʁɑ̃)	*grande*	(gʁɑ̃d)
PETIT	'small'	*petit*	(pəti)	*petite*	(pətit)

Table 3. Stem space of LAVER 'to wash', FINIR 'to finish', MOURIR 'to die' and BOIRE 'to drink'.

♯	Stem use	LAVER	FINIR	MOURIR	BOIRE
1	imperfect, pres. 1/2pl	lav	finis	muʁ	byv
2	present 3pl	lav	finis	mœʁ	bwav
3	present sg	lav	fini	mœʁ	bwa
4	present participle	lav	finis	muʁ	byv
5	imperative 2sg	lav	fini	mœʁ	bwa
6	imperative 1/2pl	lav	finis	muʁ	byv
7	pres. subjv. sg & 3pl	lav	finis	mœʁ	bwav
8	pres. subjv. 1/2pl	lav	finis	muʁ	byv
9	infinitive	lave	fini	muʁi	bwa
10	future, conditional	lav	fini	muʁ	bwa
11	simple past, past subjv.	lava	fini	muʁy	by
12	past participle	lave	fini	mɔʁt	by

even though these zones do not form a consistent class of morphosyntactic property sets. The fact that allomorphy appears in such morphosyntactically inconsistent zones had already been noted by Maiden (1992) and Aronoff (1994), and moreover, is at the origin of the morphome hypothesis by Aronoff (1994). On this basis, and building on other studies on different languages, like Brown (1998) for Russian verbs or Pirrelli & Batista (2000) for Italian verbs, Bonami & Boyé proposed that each French verb has a list of indexed morphomic stems organized in a stem space. The stem space worked out by Bonami & Boyé for French verbs has 12 slots and is presented and illustrated in Table 3 with a few examples. Each slot is used to build a part of the paradigm: for instance stem 1 is used to inflect the present 1st and 2nd person plural forms (*lavons, lavez, finissons, finissez, mourons, mourez, buvons, buvez*) and all imperfect forms (e.g. *buvais, buvais, buvait, buvions, buviez, buvaient*). The stem slots are linked to one another by default implicative rules: for instance stem 2 is normally identical to stem 1, stem 3 is normally identical to stem 2, stem 12 is normally identical to stem 3 ⊕ /e/ etc. So that for a regular verb, we only need to know one stem in order to deduce its whole stem space. Irregular verbs are those which violate a default rule, so that more than one stem is needed to build the

Table 4. Examples of derivatives formed on stem 13.

Verb		Stem 11	Stem 13	Derivative
ALTERNER	'to alternate'	altɛʁna	altɛʁnat	ALTERNATEUR, ALTERNATIF
CORRÉLER	'to correlate'	koʁela	koʁelat	CORRÉLATION, CORRÉLATIF
DÉFINIR	'to define'	defini	definit	DÉFINITION, DÉFINITIF
FORMER	'to form'	fɔʁma	fɔʁmat	FORMATION, FORMATEUR

Table 5. Stem space for adjectives, from (Bonami & Boyé 2005).

Lexeme		Stem 1	Stem 2
JOLI	'pretty'	ʒoli	ʒoli
PETIT	'small'	pəti	pətit
GRAN	'tall'	gʁɑ̃	gʁɑ̃d
BON	'good'	bɔ̃	bɔn
FIN	'thin'	fɛ̃	fin

whole stem space. Bonami, Boyé & Kerleroux (2009) also showed that a thirteenth stem is needed to account for deverbal lexemes suffixed with *-ion*, *-if* or *-eur/-rice*. This additional stem is hidden to inflection and is only used in derivation. By default, stem 13 is identical to stem 11 ⊕ /t/, as shown in Table 4, but the final /t/ is changed to [s] before the suffix /jɔ̃/, as in DÉFINITION which is pronounced /definisjɔ̃/.

To account for the inflection of adjectives Bonami & Boyé (2005) proposed a stem space with two slots, which is presented in Table 5. Stem 1 is used to build the masculine form except in liaison contexts in the singular, whereas stem 2 is used to build the feminine form and construct derivatives; a rule of stem selection links the masculine singular liaison form to both stems. By default, stem 1 is identical to stem 2, but when the adjective ends with a latent consonant, like PETIT or GRAND, stem 1 is obtained from stem 2 by deletion of the final consonant. When the adjective ends with a nasal vowel like BON or FIN, stem 1 is obtained from stem 2 by deletion of the final nasal consonant and nasalization of the ending oral vowel.

As for nouns, Plénat (2008) and Roché (2010) have proposed that they have a stem space rather similar to that of adjectives. We can therefore keep the same two slots stem space for nouns, which allows us to account for nouns ending with a latent consonant like ALIMENT 'food' or a nasal vowel like BOUTON 'button', as shown in Table 6. In the case of nouns, stem 1 is used to build the singular and the plural forms, whereas stem 2 is only used to derive lexemes, as shown in Table 6. Verbs, adjectives and nouns having such stem spaces, lexeme-formation rules take a whole stem space as input and form a whole stem space as output. (Bonami & Boyé 2005) and (Bonami, Boyé

Table 6. Stem space for nouns.

Lexeme		Stem 1	Stem 2	singular		derivative	
ALIMENT	'food'	alimɑ̃	alimɑ̃t	*aliment*	(alimɑ̃)	ALIMENTAIRE	(alimɑ̃t-ɛʁ)
BOUTON	'button'	butɔ̃	buton	*bouton*	(butɔ̃)	BOUTONNIÈRE	(buton-jɛʁ)
DRAP	'sheet'	dʁa	dʁap	*drap*	(dʁa)	DRAPERIE	(dʁap-əʁi)
JARDIN	'garden'	ʒaʁdɛ̃	ʒaʁdin	*jardin*	(ʒaʁdɛ̃)	JARDINIER	(ʒaʁdin-je)
PLOMB	'lead'	plɔ̃	plɔ̃b	*plomb*	(plɔ̃)	PLOMBIER	(plɔ̃b-je)

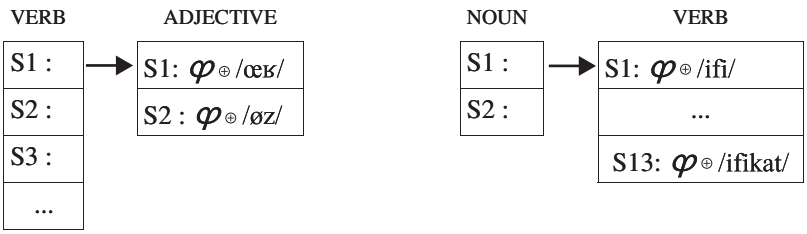

Figure 1. Phonological effects of the *-eur/-euse* and the *-ifier* suffixation rules.

& Kerleroux 2009) show that this is crucial to accounting for rules such as the *-eur/-euse* or the *-ifier* suffixation rules. The *-eur/-euse* suffixation, which forms adjectives out of verbs, selects the verb stem 1 as input, and forms both the adjective's stem 1 by suffixing /œʁ/ to the verb stem 1, and the adjective's stem 2 by suffixing /øz/ to the verb stem 1, as sketched in Figure 1. As for the *-ifier* suffixation rule deriving verbs from nouns or adjectives, it forms both the verb stem 1 by suffixing /ifi/ to stem 2 of the base, and the verb stem 13 by suffixing /ifikat/ to the base's stem 2, as shown in Figure 1. This accounts for the fact that all nouns suffixed with *-ion* which derive from a verb suffixed with *-ifier*, have an ending in *-cation*, like MOMIFICATION 'mummification', derived from the verb MOMIFIER 'to mummify', which itself derives from the noun *momie* 'mummy'.

The main goal of this paper is to show how the stem space can be used to account for verb to noun conversion in French. Before proceeding I will show that the verbal stem space worked out by Bonami & Boyé is not sufficient to account for all derivation rules.

3 Extending the stem space

As we have seen, Bonami, Boyé & Kerleroux (2009) propose a verbal stem space with 13 slots: 12 are needed to inflect the verbs, and a thirteenth is needed to derive a number of lexemes. I will show, however, that certain derivations are unaccounted for, and that these require another additional slot in the verbal stem space.

Table 7. Adjective > verb and noun > verb conversions.

Base adj/noun		Stem 1	Stem 2	Derived verb		Stem 3
CALME	'calm'	kalm	kalm	CALMER	'to calm'	kalm
VIDE	'empty'	vid	vid	VIDER	'to empty'	vid
PRÉCIS	'precise'	pʁesi	pʁesiz	PRÉCISER	'to clarify'	pʁesiz
INQUIET	'worried'	ɛ̃kjɛ	ɛ̃kjɛt	INQUIÉTER	'to worry'	ɛ̃kjɛt
BAVE	'drool'	bav	bav	BAVER	'to drool'	bav
CLOU	'nail'	klu	klu	CLOUER	'to nail'	klu
DRAP	'sheet'	dʁa	dʁap	DRAPER	'to drape'	dʁap
RÈGLEMENT	'rules'	ʁɛgləmɑ̃	ʁɛgləmɑ̃t	RÈGLEMENTER	'to regulate'	ʁɛgləmɑ̃t

Table 8. Verbs whose stem 3 are not identical to stem 2 of their base.

Base adj/noun		Stem 2	Derived verb		Stem 3
MÛR	'ripe'	myʁ	MÛRIR	'to ripen'	myʁi
ROUGE	'red'	ʁuʒ	ROUGIR	'to redden'	ʁuʒi
FARCE	'stuffing'	faʁs	FARCIR	'to stuff'	faʁsi
FLEUR	'blossom'	flœʁ	FLEURIR	'to blossom'	flœʁi

3.1 Problematical derivations

Usually with the adjective to verb conversion, like in (3a), or the noun to verb conversion as in (3b), stem 2 of the base adjective or the base noun is identical to the converted verb's stem 3, as shown in Table 7.

(3) (a) CALME 'calm' > CALMER 'to calm'
PRÉCIS 'precise' > PRÉCISER 'to clarify'
(b) BAVE 'drool' > BAVER 'to drool'
DRAP 'sheet' > DRAPER 'to drape'

However, in some cases the derived verb's stem 3 is not identical to the base's stem 2, as shown in Table 8. In these cases, according to Bonami and Boyé the verb's stem 3 always has an additional /i/ which is absent from the base adjective or noun.

The examples given in Table 8 illustrate the problem raised by second conjugation verbs. Traditional grammars consider that there are two main conjugation classes in French, which are called "conjugation groups". The first group includes all verbs with an infinitive in *-er* (e.g. *chanter* 'to sing') and a simple past formed with the thematic vowel *a* (e.g. *chanta* 'sang'). There are about 6,000 first group verbs in

Table 9. Cases when the derived verb belongs to 2nd conjug. group.

Base adj/noun		Stem 2	Derived verb		Stem 1	Stem 3
MÛR	'ripe'	myʁ	MÛRIR	'to ripen'	myʁis	myʁi
ROUGE	'red'	ʁuʒ	ROUGIR	'to redden'	ʁuʒis	ʁuʒi
FARCE	'stuffing'	faʁs	FARCIR	'to stuff'	faʁsis	faʁsi
FLEUR	'blossom'	flœʁ	FLEURIR	'to blossom'	flœʁis	flœʁi

the French dictionary *Petit Robert de la langue française*. As for the second conjugation group, it contains verbs with an infinitive in *-ir* (e.g. *finir* 'to finish') and a present participle in *-issant* (e.g. *finissant* 'finishing'), of which there are about 300 in the *Petit Robert* dictionary. There also are a number of remaining classes of smaller type frequency which are traditionally lumped together as the "third group". According to the *Petit Robert* dictionary there are fewer than 400 verbs in this third group.

When the verb belongs to the second conjugation group, none of the verbal stems is identical to the base lexeme's stem 2. As presented in Table 3 with the verb FINIR, second conjugation verbs only have two distinct stems, illustrated by stem 1 and stem 3, with a systematic /is/∼/i/ alternation. And, as shown in Table 9, neither stem 1 nor stem 3 is identical to stem 2 of the base adjective or the base noun: the verb stem 1 always has an ending segment /is/, whereas the verb stem 3 always has an ending /i/, both of them being absent from the base lexeme.

Traditional French grammars consider these /i/ and /is/ segments to be part of the inflection affixes and thereby justify the inflectional classes of verbs. Bonami & Boyé (2003) used three arguments in order to prove that inflection classes are not necessary in French verbal conjugation. First, the notion of inflection classes is only relevant for regular verbs, but the second conjugation verbs are not numerous enough to decide whether they are regular or not. Second, French data violate two principles proposed by Carstairs-McCarthy (1994): the Paradigm Economy Principle, according to which the number of inflection classes cannot be superior to the number of different inflectional marks across lexemes for one and the same cell of the paradigm; and the No Blur Principle, according to which every inflectional mark must allow the speaker to identify the inflectional class. The No Blur Principle is violated because none of the inflectional marks allows us to identify the inflectional class. As for the Paradigm Economy Principle, it is also violated because, according to Bonami & Boyé, 15 inflection classes should be needed whereas the cell which has the greatest number of different marks (simple past and past participle) only has four different marks across lexemes. Eventually, Bonami & Boyé argue that there are no formal variations of the inflectional marks across lexemes. According to the authors, the variations which are observed, like the /i/ and /is/ segments for the verbs belonging to the second conjugation group, can be analysed as part of the stems instead of part of the inflectional suffixes. So that the inflectional suffixes are the same for every

Table 10. *a-* and *en-* prefixations with 2nd conjugation verbs.

	Adjective		Stem 2	Verb		Stem 3
a- prefixation	NOBLE	'noble'	nɔbl	ANOBLIR	'to ennoble'	a-nɔbli
	PAUVRE	'poor'	povʁ	APPAUVRIR	'to impoverish'	a-povʁi
en- prefixation	LAID	'ugly'	lɛd	ENLAIDIR	'to make ugly'	ɑ̃-lɛdi
	RICHE	'rich'	ʁiʃ	ENRICHIR	'to enrich'	ɑ̃-ʁiʃi

verb, which thereby rules out the need for inflection classes. If we endorse Bonami & Boyé's position, we must then consider that this /i/ (or /is/) is a derivational suffix which forms second conjugation verbs out of nouns or adjectives. However, two arguments used in Bonami & Boyé (2003) are not valid any more. The first one is the irregularity of the second conjugation verbs. Contrary to their previous work, the authors have argued in (Bonami, Boyé, Giraudo & Voga 2008) that on the basis of psycholinguistic experiments second conjugation verbs must be regarded as regular, so that they can form an inflection class. The second one concerns Carstairs-McCarthy's principles for inflection classes, which should be regarded as mere tendencies instead of absolute criteria. Stump (2005), for instance, has shown that the No Blur Principle does not work with verb inflection in Vedic, because the same mark is used for the same cell of the paradigm in several inflection classes, which cannot allow the speaker to identify the inflection class. Thus, the arguments defended in (Bonami & Boyé 2003) against inflection classes for verbs in French seem to be no longer valid. Moreover, I will demonstrate that analysing the /i/ (or /is/) segment as a derivational suffix is not possible because it meets three main difficulties.

3.2 Impossibility of a derivational suffix /i/

3.2.1 Non-derived verbs

The first difficulty arises with non derived second conjugation verbs. Indeed, analysing the /i/ segment as a derivational suffix is an adequate solution to account for derived second conjugation verbs like those presented in Table 9, but this analysis is impossible when the verb does not derive from any other lexeme, like the verbs in (4).

(4) AGIR 'to act', BARRIR 'to trumpet', GRAVIR 'to climb', OBÉIR 'to obey', PÉRIR 'to perish', PUNIR 'to punish', VOMIR 'to vomit'...

3.2.2 Prefixed verbs

Another problem arises with deadjectival verbs prefixed with *a-* or *en-*, like those presented in Table 10. In these cases, if the /i/ segment is analysed as a derivational

suffix, then second conjugation verbs are both prefixed and suffixed. A two-step formation of these verbs is impossible whatever the analysis is. They cannot be derived by prefixation first and then by suffixation, as illustrated in (5a), because there is no *a-* or *en-* prefixation in French which can form an adjective out of an adjective, so that the intermediate step is impossible. They could be derived by suffixation first and then by prefixation, as sketched in (5b), but then the second step would have exactly the same meaning as the first one.

(5) (a) NOBLE > *ANOBLE > ANOBLIR
LAID > *ENLAID > ENLAIDIR
(b) NOBLE > NOBLIR > ANOBLIR
LAID > LAIDIR > ENLAIDIR

Since the second step in (5b) does not carry any semantic content, the *a-* and *en-* prefixes could be analysed as interfixes, which have been defined by Plénat & Roché (2004), Roché (2003) and Roché (2005) as affix-like but semantically empty segments, used for phonological needs in certain derivations. According to Plénat (2005), there are two cases when interfixes are needed: when a suffix (or a prefix) must be distinguished from the final (or the beginning) segment of the base, or when the base is monosyllabic. In (5b), however, none of these cases justify the use of an interfix: on the one hand, the bases of the second step, NOBLIR and LAIDIR, already are disyllabic; on the second hand, *a-* and *en-* are not used to distinguish the beginning of the bases from any other prefix. To conclude, *a-* and *en-* cannot be analysed as interfixes, and the analysis in (5b) by suffixation first and then by prefixation is therefore impossible because the first and the second steps would have the exact same meaning.

Since a two-step analysis of the verbs in Table 10 is impossible, if we still want to analyse the /i/ segment as a derivational suffix, then we have to consider that these verbs are formed parasynthetically, by adding simultaneously a prefix and a suffix. However, the existence of parasynthetic formation in French is controversial. Corbin (1987) has argued that, in French, lexemes which are traditionally analysed as parasynthetic, like the verb EMBARQUER 'to embark' deriving from the noun BARQUE 'bark', are not really formed parasynthetically and are only prefixed. According to the author, the erroneous analysis of such verbs is due to the inflectional suffix *-er* being confused with a derivational suffix. Fradin (2003) has shown that a small number of French nouns suffixed with *-ure*, like *encablure* 'cable's length', can be formed parasynthetically, but, according to him, verbs are never formed parasynthetically in French. Although Corbin's argument on first conjugation verbs is valid, a parasynthetic analysis of the cases at hand can not be so readily dismissed, as there is no consensus on treating the *-i-* of second conjugation verbs as part of the stem or as an inflectional exponent. However, first conjugation verbs which are prefixed with *a-* or *en-* can only be analysed as prefixed verbs, while showing exactly the same kind of meaning as the second conjugation verbs (see Table 11). It seems cumbersome to

Table 11. *a-* and *en-* prefixations with 1st conjugation verbs.

	Adjective		Stem 2	Verb		Stem 3
a- prefixation	JUSTE	'accurate'	ʒyst	AJUSTER	'to adjust'	a-ʒyst
	SÛR	'sure'	syʁ	ASSURER	'to ensure'	a-syʁ
en- prefixation	BÊTE	'stupid'	bɛt	EMBÊTER	'to bother '	ɑ̃-bət
	NIAIS	'silly'	njɛz	ENNIAISER	'to make silly'	ɑ̃-njɛz

assume two distinct *a-* prefixations and two distinct *en-* prefixations, which both form verbs out of adjectives with the same meaning, one of them being used parasynthetically with a suffix, and the other one being used alone.

Another solution could be to consider that the verbs ANOBLIR and ENLAIDIR result from a prefixation operation only, just like AJUSTER and EMBÊTER, and that the /i/ suffix is only added in order to highlight the categorial operation building a verb out of an adjective.[2] This kind of solution has already been proposed by Corbin (1987) in order to account for adjectives like ANTIALCOOLIQUE or ANTICANCÉREUX which derive from the nouns ALCOOL 'alcohol' and CANCER 'cancer', and not from the adjectives ALCOOLIQUE 'alcoholic' and CANCÉREUX 'cancerous' because their meaning is not 'anti alcoholic' and 'anti cancerous' but 'anti alcohol' and 'anti cancer'. According to this hypothesis, the *-ique* and *-eux* suffixes only mark the formation of adjectives but have no semantic content. However, the case of prefixed verbs like ANOBLIR and ENRICHIR seems different for two main reasons. First, a lot of denominal prefixed adjectives have two competing forms, with and without suffix, like ANTICANCÉREUX which also exists as ANTICANCER with the exact same meaning. As regards this property, prefixed verbs like ANOBLIR and ENRICHIR are different because none of them can have both forms, with and without the /i/ suffix. Second, and more importantly, prefixed adjectives which also bear a suffix always have the same suffix as the suffixed adjective deriving from the base noun. For instance, ANTICANCÉREUX bears the same *-eux* suffix as the relational adjective CANCÉREUX deriving from the base noun CANCER, ANTIALCOOLIQUE has the same *-ique* suffix as the adjective ALCOOLIQUE deriving from its base ALCOOL, and ANTIGRIPPAL 'anti flu' has the same *-al* suffix as the relational adjective GRIPPAL 'flu-like' derived from the base noun GRIPPE 'flu'. Moreover, prefixed adjectives bearing a suffix different from that of the suffixed adjective are not grammatical: *ANTICANCÉRIQUE, *ANTIALCOOLEUX, *ANTIGRIPPEUX. As we can see, this is very different from prefixed verbs like ANOBLIR and ENRICHIR, because in their case there are no verbs °NOBLIR and °RICHIR deriving from the base adjectives NOBLE and RICHE, which could explain the presence of the /i/ suffix in the prefixed verbs as a mere indication of the categorial change.

To sum up, the verbs in Table 10 cannot be analysed as been formed in two steps, nor can they be formed parasynthetically. As for analysing the /i/ suffix as a mere indication of the categorial change, I have shown that this analysis is not possible contrary to prefixed adjectives like ANTIALCOOLIQUE.

Table 12. Verb to noun conversion, with 1st and 2nd conjugation verbs.

	Base verb		Stem 3	Derived noun		Stem 2
1st conj. V	MARCHER	'to walk'	maʁʃ	MARCHE	'walk'	maʁʃ
	SAUTER	'to jump'	sot	SAUT	'jump'	sot
2nd conj. V	BONDIR	'to leap'	bɔ̃di	BOND	'leap'	bɔ̃d
	ENCHÉRIR	'to bid'	ɑ̃ʃeʁi	ENCHÈRE	'bid'	ɑ̃ʃɛʁ

3.2.3 Verb to noun conversion

The third difficulty met by the analysis of the /i/ segment of the verbs' stem 3 in Table 9 as a derivational suffix arises with verb to noun conversion, like the examples in (6).

(6) BONDIR 'to leap' > BOND'leap'
ENCHÉRIR 'to bid' > ENCHÈRE 'bid'
MEURTRIR 'to hurt' > MEURTRE 'murder'

Indeed, when the base verb belongs to the first conjugation group, then the converted noun's stem 2 is identical to the verb's stem 3. But when the base verb belongs to the second conjugation group, then the converted noun's stem 2 is not identical to the verb's stem 3, but is identical to the verb's stem 3 minus /i/, as shown in Table 12. Thus, if we still want to postulate a derivational suffix /i/ which accounts for the data in Table 9, then we have to postulate a subtractive process which deletes the final /i/ from the verb stem to account for the derived nouns in Table 12. While not untenable, such a solution would be quite cumbersome. First, it would introduce a difference in the treatment of the data in Table 12 depending on the conjugation group the base verb belongs to, since first conjugation verbs do not need a subtractive process to account for their converted nouns, while second conjugation verbs do. Second, subtractive processes are what Dressler (1985) considers to be less natural processes in the theory of Natural Morphology because they contravene the constructional iconicity parameter, according to which the construction of form should be parallel to the construction of meaning. Then, postulating a subtractive process should only be done when there is no other solution.

To sum up, there are three main reasons not to analyse the final /i/ of second conjugation verbs' stem 3 as a derivational suffix. First, it cannot account for non derived second conjugation verbs like AGIR. Second, it would mean analysing prefixed verbs like APPAUVRIR or ENRICHIR as formed parasynthetically and treating them differently from prefixed verbs belonging to the first conjugation group, like AJUSTER or ENNIAISER. Third, it would lead us to postulate a subtractive process to account for verb to noun conversions when the base verb belongs to the second conjugation group. Therefore I propose an alternative solution, which is to extend the verbal stem space.

Table 13. Conversions and prefixations for 2nd conjugation verbs with the additional stem 0.

Base adj/noun		Stem 2	Derived verb		Stem 0	Stem 3
ROUGE	'red'	ʁuʒ	ROUGIR	'to redden'	ʁuʒ	ʁuʒi
FLEUR	'blossom'	flœʁ	FLEURIR	'to blossom'	flœʁ	flœʁi
PAUVRE	'poor'	povʁ	APPAUVRIR	'to impoverish'	a-povʁ	a-povʁri
RICHE	'rich'	ʁiʃ	ENRICHIR	'to enrich'	ɑ̃-ʁiʃ	ɑ̃-ʁiʃi

3.3 An additional stem: stem 0

In order to maintain the identity between the base noun or adjective and the derived verb for noun > verb and adjective > verb conversions, as well as the identity between the base verb and the derived noun for verb > noun conversion, and the identity between the base adjective and the derived verb minus the prefix in the case of prefixed verbs, we can postulate another additional stem in the verbal stem space. This additional stem should be shorter than the other stems for second conjugation verbs and should not present the final /i/. Since it is shorter we can call it 'stem 0', but its name is not significant. Table 13 presents some conversions and prefixations deriving a second conjugation verb by means of stem 0.

Now that stem 0 is postulated, its relations with the other slots in the stem space also need to be specified. As already mentioned, stem 0 is also useful to account for verb to noun conversion, so that its relation to any other verb stem can be determined by looking at which other verbal stem is identical to converted nouns. Regular verbs like DANSER 'to dance' cannot help in this task because all their stems are identical, except stems 9, 11 and 12 which are regularly derived from the others. But irregular verbs like those presented in (7) can help. Indeed, if we look at their whole stem space, there are only two candidate slots to relate to stem 0: stem 3 (present indicative singular) and stem 5 (imperative singular), as shown in bold characters in Table 14.

(7) DÉBATTRE 'to debate' > DÉBAT 'debate'
CROÎTRE 'to grow' > CROÎT 'growing'
DESSERVIR 'to unserve' > DESSERT 'dessert'
DEVOIR 'to owe' > DOIT 'what is owed'
SOUTENIR 'to support' > SOUTIEN 'support'
REMORDRE 'to bite' > REMORDS 'remorse'

There are only three verbs in French which have a stem 5 different from stem 3 and which could help to determine which of these two stems must be preferred: AVOIR 'to have', ÊTRE 'to be' and SAVOIR 'to know', as shown in Table 15. However it is difficult for us to imagine a converted noun deriving from these verbs in order to determine which of the two stems is identical to the converted noun. Since each verb has a stem 5 identical to its stem 3 except the three verbs in Table 15, a specific slot for stem 5 would not be needed if it were not for these three verbs. Therefore, I will assume that

Table 14. Stem space of certain irregular verbs.

#	Stem's use	DÉBATTRE 'to debate'	CROÎTRE 'to grow'	DESSERVIR 'to unserve'	DEVOIR 'to owe'	SOUTENIR 'to support'	REMORDRE 'to bite'
1	imperfect, pres. 1/2pl	debat	kʁwas	desɛʁv	dəv	sutən	ʁəmɔʁd
2	present 3pl	debat	kʁwas	desɛʁv	dwav	sutjɛn	ʁəmɔʁd
3	present sg	**deba**	**kʁwa**	**desɛʁ**	**dwa**	**sutjɛ̃**	**ʁəmɔʁ**
4	present participle	debat	kʁwas	desɛʁv	dəv	sutən	ʁəmɔʁd
5	imperative 2sg	**deba**	**kʁwa**	**desɛʁ**	**dwa**	**sutjɛ̃**	**ʁəmɔʁ**
6	imperative 1/2pl	debat	kʁwas	desɛʁv	dəv	sutən	ʁəmɔʁd
7	pres. subjv. sg & 3pl	debat	kʁwas	desɛʁv	dwav	sutjɛn	ʁəmɔʁd
8	pres. subjv. 1/2pl	debat	kʁwas	desɛʁv	dəv	sutən	ʁəmɔʁd
9	infinitive	debat	kʁwat	desɛʁvi	dəvwa	sutəni	ʁəmɔʁd
10	future, conditional	debat	kʁwat	desɛʁvi	dəv	sutjɛ̃d	ʁəmɔʁd
11	simple past, past subjv.	debati	kʁy	desɛʁvi	dy	sutɛ̃	ʁəmɔʁdi
12	past participle	debaty	kʁy	desɛʁvi	dy	sutəny	ʁəmɔʁdy

Table 15. The 3 verbs having their stem 5 different from stem 3.

Verb		Stem 3	Stem 5
AVOIR	'to have'	a	ɛ
ÊTRE	'to be'	ɛ	swa
SAVOIR	'to know'	sɛ	saʃ

converted nouns are always identical to their base's stem 3. And, if converted nouns like those in (7) are identical to the verb stem 3, then stem 0 must be linked to stem 3 in order to account for verb to noun conversion.

We can thus specify a new default implicative rule which links stem 0 to stem 3, so that stem 0 is identical to stem 3 minus the final /i/. And conversely, stem 3 is identical to stem 0 suffixed by /i/. However, this dependency rule only applies for second conjugation verbs. Indeed, for every other verb, stem 0 must be identical to stem 3, as shown in Table 16. So that by default stem 0 is identical to stem 3, and stem 0 is identical to stem 3 minus /i/ only when the verb belongs to the second conjugation group.

3.4 Conclusions on verbal stem space

What I have proposed here is the extension of the verbal stem space in order to account for several lexeme-formation processes. I first outlined Bonami & Boyé's assumption

Table 16. Conversions and prefixations for 1st conjugation verbs with the additional stem 0.

Base adj/noun		Stem 2	Derived verb		Stem 0	Stem 3
CALM	'calm'	kalm	CALMER	'to calm'	kalm	kalm
CLOU	'nail'	klu	CLOUER	'to nail'	klu	klu
JUSTE	'accurate'	ʒyst	AJUSTER	'to adjust'	a-ʒyst	a-ʒyst
BÊTE	'stupid'	bɛt	EMBÊTER	'to bother'	ɑ̃-bɛt	ɑ̃-bɛt

that there is no strong argument in favour of inflectional classes for verbs in French and I have tried to analyse the final /i/ of the second conjugation verbs' stems as a derivational suffix. However, I have demonstrated that this analysis is not tenable. I have then proposed an additional stem in the verbal stem space, adding at the same time a new dependency rule between stem 0 and stem 3. But I also had to distinguish the relation between stem 0 and stem 3 according to the conjugation group. So that, eventually, we are led to assume that there are at least two inflectional classes for verbs in French depending on the relations between the stems in the stem space. I thus claim, as opposed to Bonami & Boyé (2003), that conjugation classes cannot be dispensed with in French.

The verbal stem space now contains fourteen stems. Out of fourteen, twelve are used to inflect the lexemes. Two stems are invisible to inflection and are only used in derivation: stem 13 worked out by Bonami *et al.* (2009), and stem 0 which I have presented above. In the remainder of this paper I will study the use of this fourteen slots stem space made by the verb to noun conversion rule.

4 Verb to noun conversion and stem selection

Since the verbal stem space contains fourteen stems, each of them is potentially available to be the input of deverbal lexeme-formation processes. As Bonami *et al.* (2009) have shown, distinct lexeme-formation rules can select different verbal stems as input. For instance *-eur/-euse* suffixation selects verb stem 1 as input, whereas verb-noun compounding selects stem 3, as shown by the examples in Table 17. And, as also mentioned by Bonami *et al.* (2009), *-ion*, *-eur/-rice* and *-if* suffixations uniformly select verb stem 13, the final /t/ of stem 13 being changed to [s] before the suffix *-ion*. This is exemplified in Table 18. As for verb to noun conversion, I will show that this process can use three different verb stems as input: stem 0, stem 13 and stem 12.

4.1 Converted nouns deriving from stem 0

As pointed out in section 3.2, ordinary cases of verb to noun conversion are problematic when the base verb belongs to the second conjugation group, so that stem 0 is needed to account for it. We can thus assume that verb to noun conversion is characterized by the identity between stem 0 of the verb and stem 2 of the noun, whatever conjugation group the base verb belongs to, as illustrated in Table 19.

Table 17. Stem selection with *-eur/-euse* suffixation and verb–noun compounding.

Base verb		Stem 1	Stem 3	*-eur* and compound derivatives		
BOIRE	'to drink'	byv	bwa	BUVEUR	'drinker'	byv-œʁ
				BOIT-TOUT	'drink-all' (glass)	bwa-tu
FAIRE	'to make'	fəz	fɛ	FAISEUR	'maker'	fəz-œʁ
				FAIT-TOUT	'make-all' (casserole dish)	fɛ-tu
TORDRE	'to wring'	tɔʁd	tɔʁ	TORDEUR	'wringer'	tɔʁd-œʁ
				TORD-BOYAUX	'guts wringer' (bad wine)	tɔʁ-bwajo

Table 18. *-ion, -eur/-rice* and *-if* suffixations select verb stem 13.

Base verb		Stem 1	Stem 13	*-ion*, *-eur/-rice* and *-if* derivatives		
ALTERNER	'to alternate'	altɛʁn	altɛʁnat	ALTERNATIF	'alternating'	altɛʁnat-if
				ALTERNATEUR	'alternator'	altɛʁnat-œʁ
DÉFINIR	'to define'	definis	Definit	DÉFINITIF	'definitive'	definit-if
				DÉFINITION	'definition'	definis-jɔ̃
FORMER	'to form'	fɔʁm	fɔʁmat	FORMATION	'formation'	fɔʁmas-jɔ̃
				FORMATEUR	'formative'	fɔʁmat-œʁ

4.2 Converted nouns deriving from stem 13

Kerleroux (2005) also used the notion of stem space in order to analyse nouns like those in (8) as converted nouns.

(8) (a) CORRÉLAT 'correlate', POSTULAT 'postulate', PRÉDICAT 'predicate', RÉSULTAT 'result' . . .
(b) CONCEPT 'concept', DÉFENSE 'defence', SUBSTITUT 'substitute'. . .

Traditionally nouns in (8a) are analysed as deverbal nouns suffixed with *-at*. However, Kerleroux (2005) and Bonami *et al*. (2009) have shown that stem 13, postulated in order to account for deverbal *-if*, *-eur/-rice* and *-ion* suffixations, can also be used for the nouns in (8a). Indeed, nouns in (8a) are always identical to their base verb's stem 13, as shown in Table 20, so that they can be analysed as converted from this hidden stem. Moreover, such an analysis allows us to account for nouns like those in (8b), which cannot be analysed as suffixed with *-at*, but which are identical to their base verb's stem 13 too, as shown in Table 20.

I will now argue that another verb stem can feed conversion: stem 12, which is the stem used to form past participle word-forms.

Table 19. Deverbal converted nouns deriving from stem 0.

Base verb		Stem 0	Stem 3	Derived noun		Stem 2
MARCHER	'to walk'	maʁʃ	maʁʃ	MARCHE	'walk'	maʁʃ
SAUTER	'to jump'	sot	sot	SAUT	'jump'	sot
BONDIR	'to leap'	bɔ̃d	bɔ̃di	BOND	'leap'	bɔ̃d
ENCHÉRIR	'to bid'	ɑ̃ʃɛʁ	ɑ̃ʃɛʁi	ENCHÈRE	'bid'	ɑ̃ʃɛʁ

Table 20. Deverbal converted nouns deriving from stem 13.

Base verb		Stem 0	Stem 13	Derived noun		Stem 2
CORRÉLER	'to correlate'	koʁɛl	koʁelat	CORRÉLAT	'correlate'	koʁelat
POSTULER	'to postulate'	postyl	postylat	POSTULAT	'postulate'	postylat
PRÉDIQUER	'to predicate'	pʁedik	pʁedikat	PRÉDICAT	'predicate'	pʁedikat
RÉSULTER	'to result'	ʁezylt	ʁezyltat	RÉSULTAT	'result'	ʁezyltat
CONCEVOIR	'to conceive'	kõswa	kõsɛpt	CONCEPT	'concept'	kõsɛpt
DÉFENDRE	'to defend'	defɑ̃	defɑ̃s	DÉFENSE	'defence'	defɑ̃s
SUBSTITUER	'to substitute'	sypstity	sypstityt	SUBSTITUT	'substitute'	sypstityt

4.3 Converted nouns deriving from stem 12

Using the notion of stem space allows us to account for nouns like those in (9).

(9) (a) ARRIVÉE 'arrival', ENTRÉE 'entrance', PLONGÉE 'diving', TRAVERSÉE 'crossing'...
(b) CONDUITE 'driving', MISE 'stake', SORTIE 'exit/outing', VENUE 'coming'...

Nouns in (9a) are sometimes analysed as deverbal nouns suffixed with *-ée*. This is for instance the analysis given by Debaty-Luca (1986), Corbin (1987) or more recently by Namer (2009). However, this analysis meets three main difficulties. First, there is no noun suffixed with *-ée* which derives from a verb belonging to the second or the third conjugation group like *SORTÉE (from SORTIR 'to go out') or *VENÉE (from venir 'to come'). They all derive from first conjugation verbs. Second, nouns in (9a) always are identical to the past participle of the base verb. Yet, this property of the nouns is not accounted for by the *-ée* suffixation analysis. Third, this analysis cannot account for the nouns in (9b) although they are semantically very similar to the ones in (9a). If we want to analyse the nouns in (9a) as deverbal nouns suffixed with *-ée*, then we also need to analyse nouns like SORTIE as suffixed with *-ie*, nouns like VENUE as suffixed with *-ue*, nouns like CONDUITE as suffixed with *-te*, and nouns like MISE as suffixed with *-se*. The problem with such analysis postulating different suffixes is that all those nouns are semantically very similar and that except the so called *-ée* suffixation the other suffixes only form a very small set of derived nouns. Only 55 nouns have been found in the

Table 21. Deverbal converted nouns deriving from stem 12.

Base verb		Stem 0	Stem 12	Derived noun		Stem 2
ARRIVER	'to arrive'	aʁiv	aʁive	ARRIVÉE	'arrival'	aʁive
CONDUIRE	'to drive'	kɔ̃dɥi	kɔ̃dɥit	CONDUITE	'driving'	kɔ̃dɥit
ENTRER	'to enter'	ɑ̃tʁ	ɑ̃tʁe	ENTRÉE	'entrance'	ɑ̃tʁe
METTRE	'to put'	mɛ	miz	MISE	'stake'	miz
PLONGER	'to dive'	plɔ̃ʒ	plɔ̃ʒe	PLONGÉE	'diving'	plɔ̃ʒe
SORTIR	'to go out'	sɔʁ	sɔʁti	SORTIE	'exit/ outing'	sɔʁti
TRAVERSER	'to cross'	tʁavɛʁs	tʁavɛʁse	TRAVERSÉE	'crossing'	tʁavɛʁse
VENIR	'to come'	vjɛ̃	vəny	VENUE	'coming'	vəny

Petit Robert dictionary which are suffixed with the four postulated *-ie*, *-ue*, *-te* and *-se* suffixes. That means that in order to account for nouns in (9b) we have to postulate four different suffixes, each of them being responsible for the formation of about 14 nouns. Moreover, the form of the suffix depends on the conjugation pattern: *-ée* is only found in nouns deriving from first conjugation verbs, while *-ie*, *-te*, *-se* and *-ue* are only found in nouns deriving from irregular verbs from the so-called second and third groups. But other deverbal noun formation rules in French do not select the base verb to which it applies depending on the conjugation group it belongs to. For instance, the *-age* suffixation can form a noun out of a first conjugation verb like LAVER 'to wash' (> LAVAGE 'washing'), as well as a second conjugation verb like REMPLIR 'to fill up' (> REMPLISSAGE 'filling up'), or a third conjugation verb like BATTRE 'to thresh' (> BATTAGE 'threshing'). So that postulating different suffixes in order to account for the nouns in (9) is both dubious and missing a generalization.

To conclude, analysing the nouns in (9a) as nouns suffixed with *-ée* leads to many difficulties which are avoided by a conversion analysis. The alternative is to notice that the stem of the nouns in (9) all coincide with the base verb's past participle stem. Thus a better analysis takes the nouns in (9) to be nouns converted from the verb's stem 12, whatever conjugation group the verb belongs to, as shown in Table 21.

One problem still needs to be solved. Each noun in (9) is feminine, so that we can question whether they derive from the feminine past participle word-form instead of the verb stem. Indeed, in the case of Dutch, Booij (1996) has argued that some inflected forms can feed derivation, like noun-noun compounds and *-dom* or *-achtig* suffixations illustrated by the examples in (10) taken from Booij (1996:6). But, according to Booij, those inflected forms can only be inherent inflection forms. Since participles are inherent inflection forms, the nouns in (9) can be analysed as derived from the past participle word-form. However, gender is contextual in the case of past participles. Thus, the word-forms *arrivée, sortie, venue* etc. are contextually inflected for gender, so that they are ruled out as bases of the derivatives in (9). Therefore, if Booij's generalization is to be trusted, those nouns must be regarded as deriving from the verb stem and not from any word-form.

(10) (a) huiz -en-rij
house -PL row
'row of houses'

(b) docent -en -kammer
teacher -PL room
'teachers' room'

(c) held -en -dom
hero -PL -SFX
'heroism'

(d) boek -en -achtig
book -PL -SFX
'like books'

5 Conclusion

I have shown that the 13 slots stem space for verbs worked out by Bonami & Boyé (2002; 2003; 2007) and Bonami *et al.* (2009) needs to be extended in order to account for a number of lexeme-formation rules. Therefore, I have proposed an additional stem which is called stem 0 and is only used in derivation. This additional stem is identical to stem 3 minus the final /i/ when the verb belongs to second conjugation group, but it is identical to stem 3 for every other verb. Finally, I have shown that three different stems feed the conversion rule: stem 0, stem 12 and stem 13. In addition, the semantic types of converted nouns are the same whatever the base stem is, which highlights the very morphomic nature of the verb stems and their selection.

Notes

1. This article results from a joint talk given together with Bernard Fradin at the Workshop "Stems in inflection and lexeme formation" in association with the 14th International Morphology Meeting, where both *-eur* suffixation and conversion rules were discussed. However, the problems raised by conversion and the *-eur* suffixation were too complex to be presented as a single article in this special issue. That is why the present article only deals with conversion, while the *-eur* suffixation will be the object of another publication.

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   It also should be noted that Roché (2010) deals with many of the issues discussed in this paper, defending a rather different point of view. A comparison of our hypotheses will have to wait for another occasion.
2. This solution has been suggested to me by one of the reviewers, whom I whish to thank for the idea.

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